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ABSTRACT

Detailed in a case study is the improvement in a 3-year-old severely language delayed child who participated in the Self-Controlled Interactive Learning Systems program, an early childhood program incorporating educational technology. Reviewed are the student's language and behavioral accomplishments resulting from exposure to the "talking typewriter." A psychiatric evaluation report is included, as well as data from the Behavior Rating Instrument for Autistic and Other Atypical Children. Results from five standardized measures are also provided. (CL)

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DEVELOPMENTAL COMMUNICATION DISTURBANCE: A CASE STUDY

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INTRODUCTION

The experience of David illustrates the totality of the the SCILS Program, as a medium for emotional and social, as well as cognitive growth.

David was enrolled at Drexel Early Childhood Center in May 1976, when he was three years eight months of age. He was classified as an "exceptional child" due to severe developmental delay in language. Tests showed him to be functioning at an eighteen month level, a delay of more than two years. According to his mother, he had progressed normally until he was eighteen months old, when he "stopped repeating words."

David's father is a teacher and his mother works as a registered nurse. They are separated, but the father returns to the household periodically. They have four daughters, three older than David, and all living at home. Two are twins, both of whom have cerebral palsy.

I. FROM THE MONITORS' REPORT

At my first contact with him, in August 1976, David was completely non-verbal and non-responsive. He seemed to exist in a world of his own, separate from adults and other children. He never established eye contact with people, and made no verbal or non-verbal responses beyond echolalia. The only exception was that he giggled when tickled.

I began working with David in August 1976 when I became

coordinator of the SCILS program at the Drexel Early Childhood Center. Prior to this time, David had had four sessions at the talking typewriter, a total time of one hour and four minutes. The monitor's anecdotal record of his first session, in May, reported: "David had his nails painted, didn't name the colors and didn't speak. David was afraid to press the typewriter keys at first, and needed the monitor in visual sight. The door was kept slightly ajar. David was interested in typing till after the bell rang."

My first session with him, on August 9, was similar: "David watched as I painted his nails, and said nothing. While he typed randomly, he made noises as he typed. He seemed to concentrate, and repeated "B" as he typed it several times."

In our second session together: "David made the shape of the first sound of each color name with his mouth. The pre-session took fifteen minutes. I left the door open, then closed it, not being sure which he preferred. He needed coaxing to type, and typed more when the door was opened again.

In his seventh session with me, in early September, he repeated the words "purple" and "white" and painted his nails himself, though he had trouble manipulating the magic markers. He could not choose the correct color marker when he needed it.

During this time David usually typed on the periphery of the keyboard symbols, such as "upper case", "lower case"

and "quotation mark" much more often than he typed letters. He especially favored "upper case" and "lower case". He often babbled incomprehensibly as he typed, and he sometimes repeated the typewriter sounds. He typed with the door closed, and came willingly, though passively, when offered a turn at the typewriter.

He seemed interested in the typewriter, and was more involved with it than he was with anything else. He always used the maximum time alloted, fifteen minutes, and actively typed most of that time. It was thought that the environment of isolation and the opportunity to be in control of what happened, offered by SCILS, seemed to be self-rewarding for David.

In contrast, he spent his time in the classroom wandering from activity to activity, never settling to work. He stayed in his separated world. Since his time with the typewriter was the only time he actively interacted with anyone or anything, he was offered and took a turn at the typewriter every day. I worked with him each day in order to establish for him a consistent, familiar adult and routine.

David progressed gradually. By late September he could correctly choose a few of the colors, and could repeat most of the color names. He became interested in the large replica of the typewriter keyboard, which was in the typewriter room, near the table at which were held the pre and post-sessions. He pointed to the keys, and I told him the sounds. At first

he said nothing, but during the fourth session with the typewriter replica he repeated several sounds.

On September 23, which was his fourteenth turn at the typewriter, as we sat at the table for his post session, David suddenly reached behind himself to point to "TAB". He pointed to and named "upper case" and "lower case" on that side. We were both excited--he knew what he had done, and I knew that he knew. It was the first time he had shown that he could recognize, name and locate symbols from the typewriter keyboard.

We continued to work with the typewriter board and David learned to locate and name more sounds, still concentrating mostly on symbols other than letters. Soon, however, he began to type more letters, and often repeated their sounds. In the classroom he began to pay more attention to his surroundings, and seemed more alert and vital. He could build small towers or short trains with the blocks, and began to name pictures in books.

This progress was interrupted in early October, when David suddenly developed a fear of the typewriter. He worked without concern in both the pre and post-sessions, but when he entered the typewriter booth he became upset, grimacing, apparently frightened. He would not type. My attempt to comfort and encourage him, to learn what was wrong, and to demonstrate that the typewriter still worked and was the same as always, were all fruitless.

However, this led to progress in another area. David continued to be upset, but when I entered the typewriter booth to talk to him, he met my eyes with his. I felt from his facial expression that he accepted my concern and support. He spoke to me, and though I didn't understand what he was saying, it seemed communicative--for the first time he wasn't just babbling or echoing sounds.

When I consulted David's mother about the situation, she told me he had recently begun to type on a regular typewriter at home, and was frustrated when it didn't say anything. We felt that perhaps this was causing him confusion or fear concerning the "talking" typewriter, and she agreed to stop the home typing.

But this made no difference when David came to the "talking" typewriter. I took him to a regular primer typewriter that we had at the Center. He did type on this, and said some of the sounds as he typed them. He would not go to the "talking" typewriter afterwards.

The following day, David again went to the "talking" typewriter, and still would not type. I entered the booth, spoke to him, and depressed a few keys, as I had done previously. I left my hand poised over the keyboard, and David took my hand, holding it so that he caused my finger to type. After a few minutes he moved his hand so that he still held mine, but typed with his own finger. Next he let go completely and for the rest of the session alternately typed with my

hand on his own.

The following day David typed by himself, with no apparent fear. However, he insisted that the door be kept open, letting me know by leaning toward it and stretching his hand to it. He later developed a similar fear of the clock on the wall in one of the typewriter rooms, and again it subsided after a few days of showing it to him and talking to him about it.

I didn't know why these fears developed, or why they developed when they did, but it may have been that David was developing new awareness. Perhaps for the first time he noticed the typewriter and clock as things separate from himself, and found it frightening. He also seemed to be aware of another person for the first time. He looked at me directly, and seemed to listen to me, and to appreciate my concern and comfort.

He wanted to have the door of the typewriter booth open: The only time he'd had it open before was when he first started working with the typewriter, and probably needed the security of adult presence, in the new situation. Perhaps now he was desirous of such contact, though in a familiar, comfortable situation. Perhaps he wanted to become less isolated and less separated.

David's progress now became rapid, and began to carry over to the classroom situation. He learned to say all the names of the colors we used in the presession, though his

pronunciation was unclear. He could find his own name among the stack of name cards when we put it up in the classroom so that his teachers would know that he was at the typewriter. In November, he could read his own name and the names of other children in his class.

His classroom teachers worked with David to develop his sense of self, stressing body parts and working with a mirror. I showed him video tapes of his typewriter sessions, and he pointed to himself and said "David". He seemed to have an idea of himself, as a person.

Yet he seemed to lose interest in typing, or was bored. He spent less time typing, and was easily and often distracted. Since he knew most of the keyboard sounds, I decided to work in Phase 2½ with David. In this phase the child learns to type words and sentences, through dictation over the intercom or use of word cards. The keyboard stays locked until the child depresses the letter called for. The locking of the keyboard allows the child to continue his search until he reaches the one that is needed.

Usually the child would request words, but David wouldn't, so I began by helping him type his name, telling him the sounds over the intercom. At first he couldn't understand why some keys didn't work, but by the end of the first session in this new phase he grasped the idea that only the letter he needed would type. He successfully typed "David", and recognized it as his name. He threw both hands over his head, grinned

and shouted happily.

He typed his name often then, and soon could type the first three letters without help. By mid-January he could type "David" independently. By the end of February he could also type his last name correctly, without help.

Soon he was saying other children's names and could type them on phase 2½. When we looked over his paper in the post-session he could find his name, read it, and identify the sounds. Sometimes he could find other names, but often there were no spaces between the names he had typed and he couldn't find them. When I pointed them out, he read them and named the sounds in them, pronunciation remained unclear, however.

At the end of February he again become bored with typing only what he already knew, so I tried using word cards for phase 2½ instead of only auditory cues. But David couldn't use them to type--he couldn't make the connection between the word on the card and the letters on the keyboard.

I put the first lesson of the "Oralographic" Program on for David. This program introduces letter sounds, words and sentences, and eventually includes the irregular sounds and phonetic rules. The child follows directions given orally on a slide shown in the typewriter booth, and the keyboard locks to allow only the called-for key to be depressed. When the child has completed one section, the program advances automatically to the next.

Davis followed the directions successfully at first,

correctly typing the response to make the program move on. But the first lesson deals with "i", "is" and "it", and when he came to the words they seemed to be too abstract for him. He seldom repeated anything aloud, which is called for by the program. When he did speak it was impossible to differentiate between "i", "is", and "it". I couldn't tell if he understood the words or not, or whether he was differentiating among them in his mind. Further, once he progressed to this more involved section of the lesson, David soon lost interest. David was not ready for Oralographics.

David again typed in Phase 2 and auditory Phase 2½ for a few days, and I decided to try word cards again. This time I entered the booth to help him, directing him to each letter on the card as he needed to type it. Soon he could type from the cards with only occasional help.

By March, David could independently type from the cards, words he had requested--names of children in his class and of family members. He could always read the names he'd typed correctly in the post-session, and usually typed several names during each session.

David also began to talk more, and to take part in classroom activities more. His classroom teachers and I stressed verbalization, and I made certain progressions in his typewriter sessions contingent on his verbal request. For example, he had to say "go typewriter" after the pre-session when I asked him what he had to do next, and he had to say

"turn on" and "push it" before I'd let him help "turn on" the typewriter.

David began to verbalize his desires more, both in the SCILS program and in the classroom. He consistently made eye contact with people, and began to notice other children more. For example, he'd sometimes join a group that was building a block tower, and even show appropriate excitement when it collasped. He even began to misbehave, purposely dropping a magic marker on the floor during a pre-session, or closing his eyes while I spoke to him. He seemed more and more like a functioning person.

In April, college students did criterion reference testing for the program, to gauge progress made, independent of the SCILS staff. In this testing situation with an unfamiliar person, David correctly read from flash cards, six upper case and seven lower case letter sounds, eleven names, and thirteen typewriter symbols (see section on criterion referenced measures).

David continued to progress, and soon had a collection of favorite words, which he consistently requested and typed from cards. He usually typed "Daddy", "Papa", and "Mommy" from cards, his own name, without any form of aid. To type a word, he would say it, then point to the first letter, say its sound, and type it. He finished each word in this manner, and after typing it again, said it aloud. He'd then return the card to me, sliding it through the crack of an opening,

left when the typewriter booth door was closed. If I opened the door to take the card from him, he'd withhold it and say, "Close door".

In post-sessions, David could read all the words he'd typed, and name the letter sounds in them. He also told me the sounds of his first and last names so I could write them on his paper. That is, I would tell him it was time to write his name, and I would ask for each sound in succession. He told me the letter sounds and then I wrote them, he didn't just identify them after seeing them on the paper.

David would often tell me to "turn light off" as we left the room, or, sometime, "David turn light off" and I'd let him do it. When he wanted to end a session, he'd say, "Pull chair" or "get down", and would sometimes stop to comment appropriately on some child-level pictures in the hallway, saying "girl", or "boy crying".

In May, David began a period of decreased activity and progress. He typed randomly and played with the microphone in the booth. He jabbered, hummed or talked in a sing-song voice, and none of it sounded like attempts to communicate. It didn't seem to be directed or meaningful to David either.

He had trouble keeping his attention on his task during presessions. He'd sit with a magic marker in his hand, ready to color a nail, and would stare into space or at the marker, seeming to float away. Eventually, some of this "spacing-out" seemed to become intentional. David would close his eyes

when I instructed him to paint his nails, or would make faces and sing-song noises.

At first I reacted by being more directive with increasing firmness. I'd insist he color his nails faster and keep his eyes open. He responded with what seemed to be a half-hearted effort to comply. I began to feel that he was acting intentionally, and was testing me and the situation.

On two separate occasions, separated by about two weeks, I ended his session halfway through the pre-session. He had spent too much time with extraneous behavior, and after a couple of warnings, I told him his session was over and he couldn't type. I explained to him that he had certain responsibilities, he had to paint his nails without so much playing, and had to tell me the color names. He couldn't use so much time doing his nails (some pre-sessions were more than fifteen minutes long, and he had usually finished in less than ten).

After the second time he forfeited his turn, David slowly decreased his testing behavior. I continued to be firm and sometimes repeated the expectation of possible consequences of "misbehavior."

In mid August, he agreed to type from word cards when I offered them, choosing "Daddy" and "Papa". After he typed each letter he would sometimes yell, or lightly slap the side of his face or head. He seemed to be trying to prevent himself from making a mistake, or to keep the word and letters straight in his mind.

During one session he independently typed "DOG", saying each letter before typing it, and reading it aloud when he was finished. This was the first indication of his ability to type anything besides his name. In the post session he told me to write "dog" and told me each letter before I wrote it. Then he requested "CAT", and repeated those sounds.

At the end of August he read "CAR" and "BATMAN" from word cards that were taped on the outside of the typewriter booth. Again, this was the first indication he knew these words. He pointed to other words, and I read them to him. He was very excited, and typed several of the words. He continued this, and expanded his collection of words. He could read: CAR, BATMAN, MICKEY MOUSE, DOG, CAT, BUMBLE BEE. When he has typed new words, he can always read them correctly in the post session, and can read them to his teacher upon returning to the classroom. He was excited about the words, and often left the typewriter to choose new words from the door. He smiled and read the words loudly and happily.

Now David's period of testing seems to have ended. He seems again ready to direct his attention to new words and to expanding communication. He understands and can constructively utilize the benefits of the SCILS environment, in which he can initiate and control his own learning--and he finds it exciting.

In this year, David has moved toward being a fully active, aware child. His first step always occurred within

the context of the SCILS Program, where he could act independently, and could initiate, control and enjoy his learning. He has opened himself to communication, and through this, to the rest of the world.

II. AN ASSESSMENT BY CHILD PSYCHIATRIC EVALUATION

David was the product of the third pregnancy for a 32-year-old mother. The family constellation at the inception of the SCILS program for David included both parents, now divorced, a 14-year-old sister, a pair of 13-year-old dizygotic twins, and an 18-month-old sister. The child was admitted to the Drexel program at the age of 3 years and 8 months.

The obstetrical, perinatal and early developmental history are not informative. The twins had been born with "cerebral palsy" and available records indicate that the parents were anxious for early help with David inasmuch as the twins had required special education programs. David's birth was by spontaneous, uncomplicated delivery at full term, with a 4½-hour second stage, birth weight of 3,062 g and 53 cm length, both above the 90th percentile. Developmental milestones were reported to have been reached within expected age levels in all areas. He crawled by seven months, stood without support by nine months and began to walk alone by twelve months. The first single word utterances appeared at 10 months, According to the mother, a registered nurse and good observer, expressive language continued to develop until 18 months when David "stopped repeating words." The relationship of this

event with respect to the time of the fourth pregnancy and birth of the youngest sibling is not at all clear. However, the mother did not hesitate to cite "neglect by mother" as a factor possibly contributing to David's future speech and language problems.

There is a gap in developmental history until age 3, when David was said to have begun combining words and at the same time to rely increasingly on pointing, gesturing, and pulling to communicate his needs. Toilet training had been started at 30 months and was effected at 36 months, with no record of any problems. There is no history of speech dysfluency or stuttering.

By age 3;8 David was evincing no significant disturbances in feeding, elimination, self-help, or sleeping cycles, although his mood on waking was noted as "evil." His favorite play materials and activities were trucks and pegs indoors, or climbing and sliding board outdoors. There appeared to be no compulsive, repetitive, or stimulus-bound motoric behavior. A history record form of this period shows that he owned "about 100 books," was read to "regularly," and that his favorite story was "Three Bears and Teddy Bear." There was a piano at home and he showed interest in musical activity.

Of some significance is the fact that David's outdoor play (age 3;8) was restricted to the home yard, no playmates visited his home, he did not have a favorite play friend outside the family, and was not inclined to seek adult

attention. He was showing definite fears of loud noises and "overly friendly people." He did not anger easily nor develop temper tantrums. He appeared to be most fond of his one-year-old sister and did at times display jealousy towards the older sibs. At times he would bite his fingernails.

Pre-school evaluations, including a neurological study at 25 months of age, had pointed to delay in overall development. Expressive language was considered to be almost totally absent, with verbal communication limited to one-word utterances with accompanying gestures. Occasionally, "chunks" of words appeared spontaneously but not on demand. These seemed, accordingly, to be over-learned phenomena rather than formulated ideas in the service of communication.

The Stanford Binet Form L-M at age 3;4 yielded a MA of 1;10 or IQ 44, and the Vineland Social Maturity Scale yielded a Social Quotient of 44 with an age equivalent of 1.85. The Beery Buktenica Developmental Test of Visual Motor Integration yielded a VMI Age Equivalent of 2;10. Subsequent examinations of the oral and peripheral speech mechanisms revealed structural adequacy for speech production. Audiometric testing had confirmed normal hearing acuity.

When David was 3 years and 5 months of age, the foregoing findings were reviewed with the mother. The areas of greatest delay, speech and language development together with the lag in socialization, were of particular concern to the mother. He did not interact with other children. His attention span

was quite brief and he was easily distracted.

This was the situation when David was enrolled in the SCILS Program of the Drexel Early Childhood Center at the age of 3 years and 8 months. An objective comparison has been made possible by the analysis of videotaped sessions, the highlights of which are summarized in what follows. All initial observations are made on the basis of videotapes made at age 3;8. These are compared with videotapes recorded at age 5.

In order to provide a reliable and valid basis for comparison between the two periods of observation, we made use of the Behavior Rating Instrument for Autistic and Other Atypical Children (Ruttenberg et al., 1976) which has been in regular use since 1966 as an assessment procedure (BRIAAC) for autistic and other atypical children. The BRIAAC in its present form consist of 8 scales, each graded into 10 descriptive levels ranging from the most profoundly aberrant to those which approach normal developmental characteristics of the normal 4-year-old. The content and concurrent validity, intercorrelation of scales, Varimax factor analysis data and reliability calculations have been reported in the reference cited and bibliography.

The videotaping made it possible to observe and compare David's quality of relationship to adults. The general scoring of the BRIAAC placed the child initially at the level designated "3, Resistiveness, Passive." He appeared to display passivity with minimal involvement, allowing himself to be picked up,

with fleeting or minimal eye contact. The quality of contact appeared to be unselective, suggesting mechanical mirroring of relationship behaviors, rather than relating. Responsiveness was superficial and shallow. By age 5, David showed evidence of having achieved a level designated "5, Brief, sporadic but recurring attending to an adult at close range." The highest level attained, although for brief periods, could be classified as "8, Beginning to anticipate approval and disapproval and can control his behavior accordingly," or even as "9, Sharing of experience." There is little doubt that the child had achieved the capacity to demonstrate some pride in achievement, and this was done motorically and non-verbally for the most part. He touched his head and other parts of his body on successful completion of a task, showing facial expression of satisfaction or delight.

The second BRIAAC Scale pertains to communication. Examination of the initial videotape places David at Level 2. The repertoire of expression is meager. There was no evidence of any attempt to promote communication. By the time David reached age 5, he was able to communicate clearly his requests, these being for simple acts of help or attention from the adult. He was able, also, to communicate displeasure and protest. The BRIAAC Scale level for this placed him at "5."

The "Drive for Mastery" was assessed at Level "3" at the beginning of the Program, reaching Level "9" at the second period of comparison. The Level "3" describes hesitant

engaging in exploratory activity. The exploratory behavior was basically tactile. The adult's presence was necessary to provide the materials. David's fleeting activity was followed by inactivity and perseveration, rather than further exploration. He finally reached Level "9" which indicated that he knew he had accomplished something on his own. Excited by the words he had learned, he brought these to the attention of others, happily and loudly, showing pride in himself. Although the available videotapes did not show examples of self-monitoring, there is documentation by the staff that the child was able finally to "initiate and control his own learning." He could put a task aside in favor of something else and return to it later, critically considering what he was doing. To this extent, the child had achieved "Level 10" in the dimension of "Drive for Mastery."

The next BRIAAC Scale considered pertains to Vocalization and Expressive Speech. Here David began at a point somewhere between the first and second levels. Level "1" is essentially non-vocal. Level "2" is defined by the observation of formation of certain vowels. The tapes at this stage showed no variety in the total number of sounds used. At the end of the experience in this program, the taped session documented the achievement of a Level "3" capacity, with use of ungrammatical two or three word phrases. There were simple sentences consisting of words to name things, or to name actions which could be seen, e.g., "Close door."

The BRIAAC Sound and Speech Reception Scale place David at Level "7" in the earliest tapes, and Level "8" in the final tapes. At the earlier level, the child showed understanding of words and sounds in a familiar context, but with the need for clues. Awareness was evident by the way David was engaged in matching activity. He was later able to understand prohibitions, (Level "8"), commands and words without the need for accompanying gestures, but still at the single word and familiar phrase level.

The Social Functioning Scale of the BRIAAC measures the level of responsiveness to environmental pressure or demand for certain socially accepted behaviors.

Inasmuch as the videotaping was restricted to the talking typewriter, and some classroom activity, adequate evaluation of achievement on this scale was not possible. For the same reasons, the amount of material available on the tapes was not sufficient or adequate for assessment of the Body Movement or Psychosexual Development Levels. The observed data are summarized in the Table below.

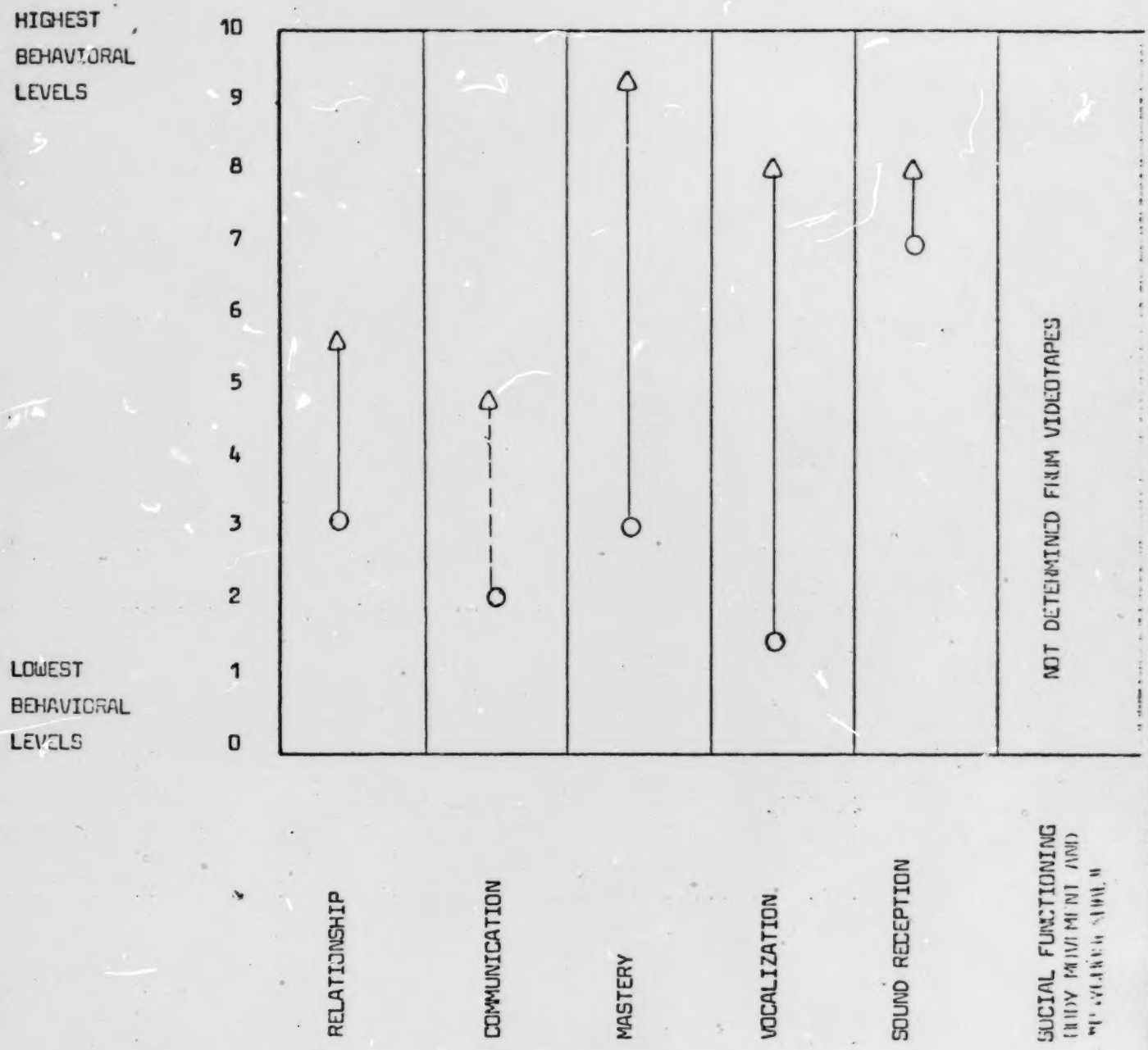

TABLE ESTIMATION OF CHANGES ACCORDING TO BRIAAC CRITERIA FOR SUBJECT (DAVID) FROM AGE 3; 8 ○ TO 5 △ .

Discussion

There are a number of features pertaining to this child's difficulties, and their resolution, which command attention and also raise more questions than can be answered at this time.

(1) We seem to have a normal birth and early developmental history, to be followed by a fairly rapid loss of communicative abilities, with impairment of human relatedness and socialization. Is it possible for the child to have sustained a brain injury or damage in fetal life, to present normal physiological behavior in the perinatal period, and then to develop obvious retardation in the second or third year of life? The answer to this question lies in the now commonly accepted observation that "Prenatal causes of permanent brain injury with severe sequelae in later childhood may be associated with normal neurological examination in the neonatal period" (Graziani et al., 1977). One can also wonder whether or not the advent of a sibling, the little sister, could have induced a "drive towards immaturation," a phrase coined by George Gardner. However, without an adequate data base, this goes beyond the limit of permissible speculation at this time. Parents' memories of early developmental events are notoriously unreliable, especially when, as in this case, there is some self-confessed admission of "neglect," or possible stress.

(2) Is there any possible significance in the history of

previous birth of cerebral palsied twins? This brings to mind the interesting observations made by Churchill (1968) that may be an association between the position of the head at birth and "acquired" infantile hemiplegia. We do not know, of course, the precise nature of the twins' cerebral palsy. Nevertheless, based on Churchill's studies, one can suggest the hypothesis that the left cerebral hemisphere (presumably the language-dominant one) may have been more obstetrically than the right. This idea is supported by observations which have confirmed that in right occiput positions at delivery the left hemisphere was found to be most vulnerable, while in the left occiput positions the right hemisphere was most susceptible to injury. Given the history of twins, each with some type of cerebral palsy, and given the history of this child, who demonstrated a profound problem in language development, one can certainly entertain certain guesses about a common denominator, that is, a common risk situation for this 32-year-old multipara. Following the reasoning of Pasamanick and Knobloch (1969), it is not inconceivable that the same situation prevailed obstetrically for the twins as for the case of David, except that the reproductive casualty was less severe and resulted in language failure.

(3) Is this an example of "early infantile autism"? Perhaps the best answer to this question resides in the analysis of the problem of autism, and the related issues of "atypical development," which are best reviewed in the publications of

the BRIAAC by Ruttenberg et al. (1976). The danger and difficulties of global labelling are well illustrated in this case, as it seems that only by tracking specific behavioral repertoires has it been possible to address observable events, to document these, and in future studies to conduct controlled experiments with enhancement of validity and reliability criteria. If we could conclude that this case did in fact reflect, at least in part, the Kanner syndrome of autism, it is interesting to consider one current view, strongly articulated in some quarters, that the syndrome is probably related to a developmental language disorder (Wing, 1976).

(4) Finally, the progress of this child in the course of the SCILS Program, clearly marked by fluctuations, advances and regressions, seems to support a point of view which is central to the learning system and its underlying propositions. Given a child so severely handicapped in most basic skills (socialization and language), the hardware equipment has enabled the child to discover the impact or the effect of his actions upon the environment, the actions have produced instantaneous feedback devoid of human (or maternal or parental) conditions, and the hardware has also made possible the engagement of more than one sensory modality. Under the guidance of the human being, ultimately to be trusted by the child, the courseware gradually was developed in a step-wise manner along with the child's own growing experience and personalized self-reward system. It becomes obvious on reviewing the child's

program that at no time were arbitrary, pre-emotions imposed upon him in terms of content, but there were restrictions and urgings which had to be introduced as a very real experience to deal with his increasing engagement, his testing, in other words, his beginning experimentation with the human being as an adventure and an object. This, of course, raises some interesting thoughts regarding the development and use of language, the implications of this child's particular arrest in his use of expressive language, his eventual loneliness and withdrawal, and the guided return to taking risks with the huge world outside himself by his inventions and trails with a machine that only made letters and words for him.

III. STANDARIZED EVALUATION

In April 1977, when he was four years 6 months, after 8 months of attendance at the Center, the following tests were adminstered to Drexel:

1) Peabody Picture Vocabulary Test
2) Illinois Test of Psycholinguistic Abilities
3) Wide Range Reading
4) Wide Range Arithmetic
5) Frostig Test of Visual Perception

With the exception of the ITPA, David was able to understand the directions and respond to the task of each test. His scores on the test ranged from two years 6 months to four years 9 months, the latter being achieved on the spatial relations sub-test of the Frostig.

On the Peabody, David achieved a mental age of two years 6 months. This score, however, may be depressed because David was easily distracted during the testing session.

On the ITPA, except for one sub-test, David listened to directions but did not respond, the exception was sound blending. Although he could not blend, he was able to name the pictures. No score was given on this test.

On the WRR, David was able to give the sounds of the following letters, A, M, E, B, O, T, P, I. This placed him at the p.k. (pre-kindergarden) 9 level.

On the WRA, he counted to 2 and then counted out of sequence. Though the counting was out of sequence, his behavior indicated that he was beginning to separate numerals into a class.

David's performance was strongest on the Frostig. His age equivalants for the sub-tests are as follows:

1) eye-motor co-ordination: 3 years 3 months

2) figure-ground: 2 years 6 months

3) constancy of shape: 4 years

4) position in space: 4 years

5) spatial relationships: four years 9 months

David's behavior on the Frostig gave indications that his performance would improve in the future. Though he could not stay within the lines on some parts of the eye-motor coordination sub-test, he was able to follow their curves and angles. Though he did not trace the figures in the figure-

ground sub-test, he was able to recognize them. Though he circled some inappropriate figures on the constancy of shapes sub-test, he was able to identify both circles and squares. Though he was not able to complete all the items on the spatial relations sub-tests, his lines grew more complex as the items he was to copy grew more complex.

IV. CRITERION REFERENCED MEASURES

Criterion Referenced Measures provide information about levels of competency. They determine whether specific areas of the curriculum have been learned. The measures look at the individual and identify the level of performance which is being achieved. Criterion Referenced Tests are mastery tests in which the individual is compared with his own past performance rather than with a normative population.

It should first be noted that at the time that David was tested for the Criterion Referenced Measures, he had spent a total amount of 34-hours and 26-minutes on the typewriter. This represented a span of about 10 months of attendance.

In the exploratory phase (Phase II: where the child's action triggers a verbal response from the equipment) David spent 15-hours and 8-minutes till he began to go to Phase 2-1/2. In this latter phase, words are either requested by the child or suggested by the monitor. They are given on the intercom or written on a 3x5 card and placed on the keyboard or taped above the keyboard so that the child can type the word himself.

Phase III, reverses the procedure of Phase II. Thus symbols are given and the child now reproduces them on his own, on the keyboard. It was after 29-hours and 40-minutes that David tried Phase III.

The 3x5 cards used to test the child as to his knowledge of words, had words selected from the anecdotal notebook that is kept on each child. The following is the list of words extracted from the notebook. Starred items were the words David read to the tester. It needs to be emphasized that this was an individual that David had not worked with previously. The words are reproduced exactly as they were found in the notebook. Thus, upper-case and lower-case are not uniform across words.

TOMMY*	PUCCI	Sandra*
Kelley*	BRYANT	aycha
gordon*	ellie*	dana
pucci	TYPEWRITER	Larry
GORDON*	Linda*	thomas*

These names represent the name of the monitor and two names of the staff. The other names are those of the children in his group.

David also was able to sound two upper-case letter sounds, but no lower-case sounds.

Interestingly, he also knew 13 other typewriter symbols. What is interesting is that they were all the peripheral keys

of the keyboard and had words rather than sounds of symbols as identification.

Lower case	Backspace	)
upper case	Carriage return	"
.	:	space
+	-	
x	(	
$		

Addendum

The following list of words were typed by David on the typewriter:

Tommy Kelley	Bumble Bee	Robin	No	Sit
Daddy	Pigs	Donny and Marie	Snow	Space
Mommy	Chair	Drum	Castle	Dana
Stop	Monkeys	Tamika	Crown	Gina
Dog	Car	Bus	Light	Sandra
Cat	Teacher Linda	Sugar Bear	Fonzy	Michael
Larry	Mickey Mouse	Tub	Ellie	Gordon
Molly	Mouse	Fish	Anita	Rafmia
Aycha	Circus	Chair	Pretty	Fred
Zoo	Batman	Beans	Sleep	Bryant
				Typewriter
				Donald Duck

It should be noted that these words represent mostly the child's requests. Again, names of the monitor, teachers, classmates, family members, and others are self-explanatory.

V. DISCUSSION

The theoretical framework that undergirds the educational design of the SCILS learning environment, dates to 1962 when a model of the thinking process was formulated using Wiener's principles of cybernetics. (Steg, 1962) This was applied in an experimental setting in 1967 and has been researched since. (Steg, et al....1969, 1970, 1972, 1974, 1976, 1978)

As Smith and Smith succinctly state:

. "help the learner gain control over his own actions in relation to the environment, and ... adjust educational designs and schedules to the learner's pattern of development"
. "educational design should follow human engineering principles of adapting the operational situation to the design of the human learner as it changes in development"
. "general knowledge and skills should be taught under a wide variety of feedback conditions with many materials and techniques to help the learner achieve broad understanding and control"
. "the most general characteristic of human motivation is the drive to exercise control over the environment"
. "as the individual develops feedback control of spatial relationships, progressing to control of temporal kinetic, symbolic, and abstract relationships, he becomes in effect a self-governing system."

The uniqueness of a self-controlled interactive learning system is exactly that feature. It is an environment which responds to the learner, and while it is manipulable, it is not manipulative with some rather remarkable results.

REFERENCES

Churchill, J.A. "A Study of Hemiplegic Cerebral Palsy." Develop. Med. Child Neurol. 10, 1968, 453-459.

Graziani, L.J., Korberly, B., and D'Amato, G. "Brain and Behavior in The Neonatal Period." In Topics in Child Neurology (Blaw, M.E., Rapin, I. and Kinsbourne, M., Eds.) Spectrum Publications, 1977.

Pasamanick, B. and Knobloch, H. "Brain Damage and Reproductive Casualty." Amer. J. Orthopsychiat, 30, 1969, 298-305.

Ruttenberg, B.A., Kalish, B.I., Wenar, C. and Wolf, E.G. Behavior Rating Instrument for Autistic and Other Atypical Children. The Developmental Center for Autistic Children, Philadelphia, Copyright, 1976.

Smith, K.U. and Smith, M.F. Cybernetic Principles of Learning and Educational Design. Holt, Rinehart and Winston, Inc., New York, 1977.

Steg, D. A Philosophical and Cybernetic Model of Thinking. Doctoral Dissertation, University of Pennsylvania, 1962.

Steg, D, Fox, C., Mattleman, M., Kean, M., Schulman, R., and D'Annunzio, A. "Early Intervention Through Technology. Found: Continued Incremental Long Term Gains in Reading Through SCILS (Self-Controlled Interactive Learning Systems) (1969-1977)" American Education Research Association, Toronto, Canada, March, 30, 1978.

Steg, D. and D'Annunzio, A. "Kindergarten Children and SCILS: A Comparative Assessment of Progress: 1976-1977." Eastern Educational Research Association, Williamsburg, Virginia, March 11, 1978.

Steg, D.R., Mattleman, M., Schulman, R., Fox, C., D'Annunzio, A. "Long Term Gains from Early Intervention Through Technology (1968-1975)." Cybernetics Forum, VII, 1976.

Steg, D.R. and D'Annunzio, A. "Effects of Two Programs on Perception and Reading in Kindergarten," International Reading Association, New Orleans, May, 1974. "A Learning Print Approach Toward Perceptual Training and Reading in Kindergarten." (ERIC Clearinghouse of Reading and Communication Skills, 1975.)

Steg, D.R. and D'Annunzio, A., "Some Theoretical and Experimental Considerations of Responsive Environments, Learning and Social Development," (Procedings, First International Congress of Cybernetics, 1969, London), J. Rose (ed.) Progress of Cybernetics, Vol. 3, 1145-1161, New York, Gordon and Breach, Science Publishers, 1970.

Steg, D.R., Mattleman, M. and Hammill, D., "Effects of Individual Programmed Instruction on Initial Reading Skills and Language Behavior in Early Childhood," International Reading Association, 6 Tyre Avenue, Newark, Delaware, April, 1969.

Steg, D. and Schulman, R. "Remarks on the Possible Economic Significance of Early Childhood Educational Technology," Educational Technology Conference, Drexel University, April 8, 1972.

Wing, L. (Ed.) Early Childhood Autism. Oxford, Pergamon, 1976.